PATENT
Case No. GP-301187
(2760/5)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
APPLICATION FOR UNITED STATES UTILITY PATENT

INVENTOR(S):   EDWARD P. CHRUMKA

TITLE: METHOD AND SYSTEM FOR
PROVIDING VEHICLE-DIRECTED
SERVICES

ATTORNEY(S):   ANTHONY LUKE SIMON, ESQ.
GENERAL MOTORS CORPORATION
300 RENAISSANCE CENTER
P O BOX 300
MAIL CODE 482-C23-B21
DETROIT, MICHIGAN 48265-3000
(313) 665-4714

METHOD AND SYSTEM FOR
PROVIDING VEHICLE-DIRECTED SERVICES

RELATED APPLICATION

5

This application claims priority to United States Patent Application Serial Number 60/263,568 filed on January 22, 2001 entitled "METHOD AND SYSTEM FOR VEHICLE-DIRECTED INFORMATION SERVICE DELIVERY" by Edward P. Chrumka, the entire disclosure of which is incorporated by reference, herein.

10 ## FIELD OF THE INVENTION

This invention relates generally to delivering services, such as Internet-related or subscriber-requested services, in a vehicle such as an automobile. In particular this invention relates to a method and system for providing such vehicle directed services.

15 ## BACKGROUND OF THE INVENTION

Current methods of providing information, services and advertising to a vehicle, such as an automobile, are centered on an in-vehicle approach. To facilitate this approach, some methods use in-vehicle hardware configurations or enablers such as onboard computers. Other methods use in-vehicle hardware

20 and software configurations and enablers such as onboard databases of directions and in-vehicle computer platforms. Such methods require considerable lead time and resources. For example, analog wireless subsystems may be used to provide in-vehicle services. However, these subsystems do not provide adequate bandwidth to deliver a full range of

25 commercial services in-vehicle. Moreover, such methods often do not provide information to the vehicle that is as up-to-date as is available. For example, on-board databases provide geographic information at the time the database is

created and must be updated periodically to remain current. Such on-board databases are typically very expensive. Additionally, such methods do not provide a full range of services in-vehicle in a consistent manner.

5   It would be desirable therefore to provide a method for providing services to a vehicle that overcomes the above difficulties.

SUMMARY OF THE INVENTION

A method for directing service in a vehicle is provided. A service request
10   is received from the vehicle. A vehicle location is also received.
Delivery-enabling information is determined based on the service request and the vehicle location. The service corresponding to the service request is configured based on the delivery-enabling information. The configured service is sent to the vehicle.

15   A signal including a vehicle identifier may be received from a vehicle communication component. The vehicle identifier may be a unique code including user identifier information and vehicle location. A list of delivery channels may be sent to a vehicle communication component. A channel may be selected from the list of delivery channels to deliver the configured service
20   corresponding to the service request. The configured service may then be optimized for communication based on the determined delivery channel. A vehicle communication component in the vehicle may be configured based on the delivery-enabling information. A profile may then be created that includes delivery-enabling information. At least one pre-determined user input may be
25   used to determine vehicle delivery information. Sending a service corresponding to a service request may comprise sending electronic mail to the vehicle communication component. The delivery-enabling information may be updated at the service management application while the application is in contact with the vehicle communication component.

30

A system for directing service in a vehicle is also provided. The system includes means for receiving a service request from the vehicle, means for receiving a vehicle location, means for determining vehicle delivery-enabling

5   information based on the service request and the vehicle location, means for configuring the service corresponding to the service request based on the vehicle delivery-enabling information, and means for sending the configured service to the vehicle.

The system may include means for receiving a signal including a vehicle

10   identifier from a vehicle communication component. The system may also include means for sending a list of delivery channels to a vehicle communication component. The system may also include means for selecting a channel from the list of delivery channels to deliver the configured service corresponding to the service request. The system may also include means for optimizing the

15   configured service for communication based on the determined delivery channel. The system may also include means for configuring a vehicle communication component in the vehicle based on the delivery-enabling information. The system may also include means for creating a profile that includes delivery-enabling information.

20   A computer usable medium for directing service in a vehicle is provided. The medium includes computer readable program code that receives a service request from the vehicle. The medium also includes computer readable program code that receives a vehicle location. The medium also includes computer readable program code that determines vehicle delivery-enabling information

25   based on the service request and the vehicle location. The medium also includes computer readable program code that configures the service corresponding to the service request based on the vehicle delivery-enabling information. The medium also includes computer readable program code that sends a configured service to the vehicle.

30

The medium may include computer readable program code that receives a signal including a vehicle identifier from a vehicle communication component. The vehicle identifier may be a unique code including user identifier information and vehicle location. The medium may also include computer readable program code that sends a list of delivery channels to a vehicle communication component. The medium may also include computer readable program code that selects a channel from the list of delivery channels to deliver the configured service corresponding to the service request. The medium may also include computer readable program code that optimizes the configured service for communication based on the determined delivery channel. The medium may also include computer readable program code that configures a vehicle communication component based on the delivery-enabling information. The medium may also include computer readable program code that creates a profile that includes delivery-enabling information. Determining vehicle delivery-enabling information may be based on at least one pre-determined user input. The medium may also include computer readable program code that sends a service corresponding to a service request comprising sending electronic mail to the vehicle communication component. The medium may also include computer readable program code that updates the delivery-enabling information at the service management application while the application is in contact with the vehicle communication component.

The foregoing and other features and advantages of the invention will become further apparent from the following detailed description of the presently preferred embodiments, read in conjunction with the accompanying drawings. The detailed description and drawings are merely illustrative of the invention rather than limiting, the scope of the invention being defined by the appended claims and equivalents thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram of a system for providing services in a vehicle in accordance with the present invention;

5 FIG. 2 is a schematic diagram of another embodiment of a system for providing services in a vehicle in accordance with the present invention;

FIG. 3 is a schematic diagram of one embodiment of a service management subsystem for providing services in a vehicle in accordance with the present invention;

10 FIG. 4 is a schematic diagram of a communication subsystem for providing services in a vehicle in accordance with the present invention;

FIG. 5 is a schematic diagram of a content subsystem for providing services in a vehicle in accordance with the present invention;

FIG. 6 is a flow diagram of one method for providing services in a vehicle 15 in accordance with the present invention;

FIG. 7 is a sequence diagram of another embodiment of a method for providing services in a vehicle in accordance with the present invention;

FIG. 8 is a sequence diagram of another embodiment of a method for providing services in a vehicle in accordance with the present invention;

20 FIG. 9 is a sequence diagram of one embodiment of a method for providing subscriber services in a vehicle in accordance with the present invention;

FIG. 10 is a sequence diagram of another embodiment of a method for providing subscriber services in a vehicle in accordance with the present 25 invention;

FIG. 11 is a sequence diagram of another embodiment of a method for providing subscriber services in a vehicle in accordance with the present invention;

FIG. 12 is a sequence diagram of one embodiment of a method for providing information services in a vehicle in accordance with the present invention;

5   FIG. 13 is a sequence diagram of another embodiment of a method for providing information services in a vehicle in accordance with the present invention; and

FIG. 14 is a sequence diagram of one embodiment of a method for providing communication services in a vehicle in accordance with the present

10   invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

FIG. 1 shows one embodiment of a system for providing services to a vehicle in accordance with the present invention at **100**. The system **100** may include one or more vehicle clients **10**, one or more carrier systems **20**, one or

15   more communication networks **30** and one or more service management subsystems **40**. The service management subsystems may comprise one or more service management applications **42** and one or more managers **44**.

Vehicle client **10** may be any suitable vehicle. For example, the vehicle may be an automobile or a passenger-carrying unit such as a bus or train.

20   Alternatively, vehicle client **10** may be an occupant of the vehicle or any suitable client device contained in the vehicle. In one embodiment of the invention, vehicle client **10** is a mobile or portable device equipped to communicate with service management subsystem **40**.

Carrier system **20** may be any suitable system for transmitting a signal from vehicle **10** to service management subsystem **40**. Carrier system **20** may also transmit a signal from service management subsystem **40** to vehicle client

5   **10**. In one embodiment of the invention, carrier system **20** is a wireless carrier system as is well known in the art. Carrier system **20** may be, for example, a transmitter/receiver unit attached to vehicle client **10**. Alternatively, carrier system **20** may be a separate transmitter/receiver carried by vehicle client **10**.

Communication network **30** is any suitable system for communicating

10   between vehicle client **10** and service management subsystem **40**. In one embodiment of the invention, communication network is a public switched telephone network (PSTN). Alternatively, communication network **30** may be a multiprotocol Internet or intranet capable or transmitting voice and/or data in either analog or digital form or a combination of both.

15   Service management subsystem **40** is a system for managing a variety of services to be delivered to or from vehicle client **10**. In one embodiment of the invention, service management subsystem **40** manages services that are distributable over a variety of channels. For example, services may be delivered via a live agent, such as a human advisor, or via a virtual agent, such as an

20   interactive computer program. The structure of service management subsystem **40** may enable services to be delivered in a uniform manner regardless of the channel used for delivery or of the service being delivered. Service management subsystem **40** may maintain a consistent subscriber experience and "look and feel" across the products being delivered across the service distribution channels

25   enabled.

Service management subsystem **40** may be any suitable hardware or software configuration, or combination of hardware and software that is configured to standardize each service being delivered via the subsystem **40** and

5   to standardize each channel of delivery. In one embodiment of the invention, service management subsystem **40** standardizes each service and channel using personalization information from vehicle client **10**. Thus, service management subsystem **40** may have a common profile mechanism across the services being delivered independent of the service distribution channel (live

10   agent, virtual agent, web channel, speech channel) and of the service (news, weather, sports, stocks, etc.). In one embodiment of the invention, service management subsystem comprises one or more application components **42** and one or more service managers **44**. For example, application **42** may be any suitable software application for managing one or more services. Service

15   managers **44** may be any suitable hardware and/or software configuration or structure for executing applications **42**.

FIG. 2 shows another embodiment of a system for providing services to a vehicle in accordance with the present invention at **200**. Vehicle-directed service system **200** may include a subscriber **210** and a service management application

20   **240**. In the embodiment shown in **FIG. 2**, the service management subsystem may be in connection with a communication network **230**, such as the Internet. Service management subsystem **240** may also be in communication with service applications or other service management subsystems. For example, in **FIG. 2**, service management subsystem **240** is also in communication with a subsystem

25   for managing subscribers shown at **250**. Service management subsystem **240** may also be in communication with a web-based service application or other web-based service management systems or web servers. For example, in **FIG. 2**, service management application **240** is in communication with a web channel **260**.

30

In one embodiment of the invention, service management application may include an in-vehicle component **245**. This in-vehicle component may be located in or on the vehicle, or may be in communication with vehicle client **210**. In one

5 embodiment of the invention, the in-vehicle component **245** may install a software algorithm, based on the type of call originated through a voice command, in order to optimize the talk path to subscriber management application **240**. System **200** may also allow the subscriber to connect to a live administrator or advisor **270** through a spoken command acknowledged through

10 the subscriber management application **240** voice user interface (VUI).

In one embodiment of the invention, subscriber **210** may have VUI access **222** through a PSTN **220**. This may serve as the primary end user interface to service management application **240**. This VUI access may allow subscribers in their vehicles equipped in accordance with the present invention to access a

15 variety of services. For example, subscribers **210** may select and listen to news, sports, weather and stock quote information, and may browse and listen to their e-mail messages, using voice commands in a conversational manner. Furthermore, the subscriber may have the ability to interrupt or suspend the session if required. In one embodiment of the invention, connections are made

20 to the service management application **240** through the public telephone system. In one embodiment of the invention, subscriber **210** may gain audio access to subscriber management application **240** by activating an in-vehicle speech recognition application. This speech recognition application may allow the subscriber to place hands-free cell phone calls.

25

Subscriber **210** may also have graphical user interface (GUI) access **232** through a communication network **230**, such as the Internet. Such an interface may allow subscribers to access a variety of Internet and communication

5   network-based services in accordance with the present invention. For example, subscriber **210** may access email via this interface. In one embodiment of the invention, subscribers connect to the service management application **240** through the Internet **230** using standard Web browsers.

Subscriber **210** may also have GUI access through a web channel **260**.

10   This interface may be used by subscribers to access a variety of services. For example, subscriber **210** may maintain one or more user profiles using web channel **260**. Subscriber **210** may also set up user-related rules such as e-mail consolidation and filtering rules. This interface may also be used to access selected content services. Vehicle data, such as diagnostic codes and

15   messages, can be consolidated and displayed using web channel **260**. As with other components of system **200**, information entered or accessed via web channel **260** may then be incorporated into new products and services for presentation over other channels in communication with service management subsystem **240**. The subscriber **210** may connect to the web channel **260** using

20   standard Web browsers. In one embodiment of the invention, standard web channel software interacts with the service management application to update subscriber profiles and/or to obtain information of interest. In one embodiment of the invention, the web channel **260** interface uses a dedicated connection to the service management system **240**.

25

System **200** may also include one or more administrators **270**. Administrator **270** may use GUI access to manage service management system **240** and information related to system **200**. Administrator **270** may be, for

5   example, a live advisor available to advise subscriber **210**. Administrator **270** may also be, for example, an individual maintaining or administering service management subsystem **240**. In one embodiment of the invention, administrator **270** accesses service management subsystem **240** via subscriber management subsystem **250**. For example, administrator **270** may send configuration and

10   subscriber information to service management system **240**. Administrator **270** may also receive notifications of interesting events within system **200**. In one embodiment of the invention, subscriber management subsystem **250** uses a dedicated connection between administrator **270** and service management system **240**.

15   As seen in **FIG. 2**, system **200** may also include one or more message servers **234**. These messages may be, for example, voice or text or e-mail mail messages. In one embodiment of the invention, message servers **234** communicate with service management application **240** via Internet **230**. Thus, subscribers **210** may receive incoming email messages from, and send outgoing

20   e-mail messages to, external mail transport agents using any suitable messaging protocol as is well known in the art. Message servers **234** may also be used to retrieve subscribers' e-mail from outside mail storage servers for consolidation into their e-mail accounts connected to system **200**.

As seen in **FIG. 2**, system **200** may also include one or more news and or

25   sports feeds **236**. In one embodiment of the invention, feeds **236** are provided by a network news content provider. Feeds **236** may be used to receive and store audio news and sports stories for playback to interested subscribers **210**. The primary interface between the speech channel and news content provider **236** may be via the Internet **230**. In one embodiment of the invention, a satellite

30   feed **246** serves as a backup mechanism.

As seen in **FIG. 2**, system **200** may also include one or more weather services **248**. In one embodiment of the invention, the services are provided by any suitable weather reporting service. Weather services **248** may be used to receive and store regional and local weather information for playback to interested subscribers **210**. Furthermore, the weather content can be delivered based on the vehicle location by coordinating the weather zone with the vehicle GPS location. The weather service **248** and/or content feed may be co-located with the service management system **240**.

System **200** may also include one or more finance services **238**. For example, stock quotes may be provided to the subscriber. Any suitable finance technology may be used to provide these services to interested subscribers. In the embodiment of **FIG. 2**, the finance information is obtained at the time of the request through Internet attached content sources or dedicated connections **230** as is known in the art.

System **200** may also include other services to be delivered in addition to news, weather, sports and finance services as described above. For example, yellow pages listings, special interest content (e.g., movie or restaurant reviews), or content related to the location of the vehicle (e.g. travel profiles of nearby tourist attractions) may all be delivered via system **200**.

FIG. 3 shows one embodiment of a subsystem for providing services to a vehicle in accordance with the present invention at **300**. This subsystem **300** may be used, for example, within system **200** as described above. In one embodiment of the invention, this subsystem **300** is used to interface with a public switched telephone network such as PSTN **220**. For example, subsystem **300** may connect to PSTN **220** to communicate with subscriber **210** and vehicle. Subsystem **300** may also connect to subscriber management system **250**. Subsystem **300** may use subscriber management system **250** to validate a connection and to retrieve associated subscriber information.

In one embodiment of the invention, subsystem **300** may include an in-vehicle speech recognition component **345**. Speech recognition component may be located in or on vehicle **210** and may be used to access components of
5   system **200**. For example, subscriber **210** may gain audio access to subscriber management application **250** by activating speech recognition component **345**. Speech recognition component **345** may be, for example, any suitable speech recognition application as is known in the art. Speech recognition application **345** may allow the subscriber **210** to place hands-free cell phone calls. In one
10   embodiment of the invention, the in-vehicle system **345** installs a software algorithm, based on the type of call originated through a voice command, in order to optimize the talk path to subscriber management application **250**. Speech recognition component **345** may also allow the subscriber **210** to connect to a live administrator or advisor **270** through a spoken command
15   acknowledged through the subscriber management application **250** VUI.

Subsystem **300** may include a front-end telephony component **315**. Front-end telephony component may be any suitable telephony hardware or software for enabling service management application **240** to communicate with public telephone network **220**. This may be, for example, a conventional analog
20   or digital transceiver. Front-end telephony component **315** may also connect to the PSTN **220** for communication with subscriber **210** and/or the subscriber's vehicle. Front-end telephony component **315** may also connect to subscriber management system **250** for such services as connection validation and retrieval of associated subscriber information.

25

Front-end telephony component **315** may also connect to front-end speech-enabled/multimedia subsystem **305**. In one embodiment of the invention, multimedia subsystem **305** comprises a plurality of telephony services.

5 Speech-enabled multimedia subsystem **305** may, for example, enable VUI functions. Speech-enabled multimedia subsystem **305** may also handle VUI of service management application **240**. Speech-enabled multimedia subsystem **305** may also connect to PSTN **220** to handle audio communications with subscribers **210** in their vehicles.

10 Speech-enabled multimedia subsystem **305** may be connected to script server and middle layer components **325**. Speech-enabled multimedia subsystem **305** may be used to control the dialogs of script server and middle layer components **325**. Script server and middle layer components **325** may be used to handle the actual dialog with the subscriber **210**. The script server may

15 interpret the dialog rules implemented in scripts. In one embodiment of the invention, the speech-enabled multimedia subsystem **305** converts dialog instructions into audio output for the subscriber **210** and interprets the subscriber's audio response for script server and middle layer components **325**.

System **300** may also include a communications mechanism **335**.

20 Communications mechanism **335** may be any suitable communications hardware or software that provides a remote procedure call-like paradigm. Communications mechanism **335** may be based, for example, on socket-level communications. Communications mechanism **335** may also provide a basic load balancing capability.

25 System **300** may also include back end content services **365**. These content services **365** may be any suitable content services, such as content servers or satellite feeds, which supply such products as the news, weather, sports, stock quotes and e-mail services and data to the subscribers. Content services **365** may handle interfaces to the outside world to acquire the data and

30 to exchange e-mail messages. Content services **365** may present interfaces to other components of system **200**, **300**, including web server **260**, script server

and middle layer components **325** and Internet **230**. Script server and middle layer components **325** may also access data content from content services **365**.

System **300** may also include back end infrastructure services **355**.

5 Infrastructure services **355** may be any suitable hardware components or software applications that provide infrastructure and administrative support to the content services **365** and to script server and middle layer components **325**. Infrastructure services **355** may also provide the facilities for administrators **270** to define such information as content categories and default user profiles for

10 system **200**. Infrastructure services **355** may also be used by subscribers **210** to define and maintain their own profiles. Script server and middle layer components **325** may also use infrastructure services **355** for infrastructure support.

FIG. **4** shows one embodiment of a communication subsystem for

15 providing services to a vehicle in accordance with the present invention at **400**. For example, the role of the subsystem **400** may be to handle a call from subscriber **210** into system **200** described above. In the embodiment of FIG. **4**, the communication subsystem **400** is a telephony subsystem.

In one embodiment of the invention, telephony subsystem **400** may be

20 used to establish and maintain a communications circuit between PSTN **420** and a Voice User Interface (VUI) Subsystem **405**. VUI subsystem **405** may be used to enable the dialog between the subscriber and the service management subsystem **40** described above. VUI subsystem **405** of communication subsystem **400** may be, for example, any suitable hardware and/or software

25 interface to handle speech recognition and speech generation functions.

Subsystem **400** may have an external interface **420**. In the embodiment of **FIG. 4**, this interface is a PSTN. The interface may be, for example, a high capacity connection (such as, for example, a T-3 connection) to a public phone
5   system through which calls are placed. Calls from subscribers in their vehicles may originate by dialing a dedicated phone number that is terminated on a network-based call distribution mechanism or directly on a local switching system.

Communication subsystem **400** may also provide interfaces to other
10   service management subsystem components. For example, communication subsystem **400** may communicate with a subscriber management subsystem **450**. Subscriber management subsystem **450** may be, for example, a Wide Area Network interface to a Call Center system. Subscriber management subsystem **450** may be used to fetch subscriber information. For example, subscriber
15   information may be stored as data in a suitable database and subscriber management subsystem **450** may be any suitable hardware and/or software configuration used to access this data. In one embodiment of the invention, subscriber management subsystem **450** may also comprise a management façade **454**. Management façade **454** may be, for example, any suitable
20   software and/or hardware configuration that enables consistent delivery of services across a product suite. In one embodiment of the invention, management façade **454** is configured to provide a uniform appearance and defined methodology to any entity wishing to integrate with the subscriber management subsystem **450**.

25   Communication subsystem **400** may include a hardware element **415**. This element may be, for example a switch that interfaces the service management subsystem **240** with a PSTN **420**. Hardware element **415** may operate under the control of an external host program **425**. Under the control of host program **425**, the switch **415** may route incoming data calls to one or more
30   modems **435**. These modems may interface with one or more vehicle

communications components **445**. When directed to do so, hardware element **415** may reroute calls to appropriate channels in the VUI subsystem **405**. In one embodiment of the invention, the interface between the PSTN **420** and the

5   switch **415** is a set of engineered telecommunication facilities, such as, for example, ISDN T-1 lines, each of which can support multiple independent conversations. In one embodiment of the invention, hardware element **415** also communicates with VUI subsystem **405** using similar facilities.

The vehicle communication (Veh/Comm) component **445** of subsystem

10   **400** is any suitable hardware or software configuration that serves to validate and coordinate handling of incoming calls. Veh/Comm component **445** may also retrieve associated subscriber information, and set up the telephony sessions between the subscriber and VUI Subsystem **405**. In one embodiment of the invention, when a subscriber connects to the service management system **240**

15   from a vehicle, the vehicle sends a data message containing an identifier, which is unique to the vehicle. This data message may be routed to Veh/Comm component **445** by the hardware component **415**. For example, the message may be routed through a modem **435**. Veh/Comm component **445** may send the unique identifier to subscriber management system **450** to retrieve associated

20   subscriber information. Veh/Comm component **445** may then verify the connection using a challenge/response protocol with the vehicle. If the subscriber's information is retrieved successfully and the connection verified, Veh/Comm component **445** may send a command to the vehicle to switch to voice mode. It may also send a command to the host program **425**, which

25   controls the switch **415**, to reattach the call to the VUI Subsystem **405**. In the command sent to the host program, Veh/Comm component **445** may direct the host program and the switch **415** to attach a User-to-User Information (UUI) packet. In one embodiment of the invention, the UUI packet contains a session identifier, the current GMT offset for the vehicle, a flag indicating whether the

30   user should be asked for a PIN and, if not, a Subscriber ID. The UUI packet may

be routed to the VUI subsystem **405** that handles the call. The UUI packet may also be used to set up the user session. Veh/Comm component **445** may have IP connections with the modems **435** and the host program **425**. Vehicle

5 communication component **445** may also access the service management system **240** via an engineering data communication facility.

Host program **425** of subsystem **400** is any suitable program for managing components of subsystem **400**. For example, host program **425** may serve to control the hardware component **415**, which may be a switch. During subscriber

10 connection sequences, host program **425** may direct initial call messages to modems **435**. Host program may also interface the switch **415** with vehicle communication component **445**. Host program **425** may also receive commands from Veh/comm component **445** to reattach incoming calls to VUI Subsystem **405**. Host program **425** may forward these commands to the switch **415**, and

15 may include UUI attachments from Veh/Comm component **445** which are intended to be forwarded to VUI subsystem **405**.

FIG. 5 shows one embodiment of a content subsystem in accordance with the present invention at **500**.

Components of content subsystem **500** may supply information that can

20 be delivered to subscribers in their vehicles. These services may be delivered through any of the channels described above. For example, the services may be delivered through a live agent or across a wireless communication link to a mobile device, including a mobile portable device. Alternatively, the services may be delivered to subscribers via their Web browsers when the subscribers

25 are logged into web channel **260**, the Internet **230** or a suitable web server. In one embodiment of the invention, the information available in content subsystem **500** includes but is not limited to, basic news, sports news, weather, stock quotes, and e-mail services. Service management subsystem **300**, described above, may be used to expose the content of content subsystem **500** for delivery

30 to subscribers through a live agent or across a wireless communication link to a mobile device, such as a mobile portable device.

Subscribers **210** may specify the content that they are interested in by logging into web channel **260** and setting up interest profiles. This content may include content that a subscriber wishes to hear in his vehicle or content that a

5   subscriber wishes to have available in any other manner from service management system **240**. Interest profiles may be maintained by service management subsystem **240** in order to deliver the services in a timely, accurate, and highly personalized manner. These profiles may also control the default speech behavior of service management system **240**. For example, after

10   personalizing his profile, a subscriber may automatically get quotes for a selected set of stocks, or may hear recent news in areas of particular interest while connecting to service management system **240**.

The components of content subsystem **500** may have similar high-level designs or may differ. In one embodiment of the invention, the content

15   components may be of two types: content receptors **505, 515, 525, 535, 545** which receive and store the content information locally, and content providers **537, 547** which retrieve selected data from the local store and return them (or pointers to them) to requesting components that are working on behalf of logged-in subscribers. Alternatively, the content components may serve both

20   these functions.

Content receptors **505, 515, 525, 535** and **545** may differ or may be similar in high-level design. For example, messaging content component **505** may have special needs differing from other content components **515, 525, 535** and **545**. In one embodiment of the invention, messaging content receptor **505**

25   may support unified messaging services. Alternatively messaging content receptor **505** may support electronic mail services. Meanwhile, content receptor **515** may, for example, support news services. Content receptor **525** may, for example, support sports news services. Content receptor **535** may, for example, support finance services such as stock quotes. Content receptor **545** may, for

30   example, support weather services. Alternatively, as described above,

subscriber **210** may select an entirely different suite of content receptors than those listed herein.

Content providers **537, 547** may be any suitable hardware and/or software devices that manage content as is known in the art. For example, content providers **537, 547** may be content servers. Content servers **537, 547** may provide delivery to one or more content receptors. A suitable content server may be defined as one that is able to obtain and manage the content in its domain. The types of information that can be requested and obtained may differ for each content server. However, the nature of the requests and responses may be similar. For example, in one embodiment of the invention, the subscriber passes in the specific attributes of the request to the content server **537, 547**. For example, the attributes for selecting sports news might be "basketball, men's, top-25." Content names may then be developed internally to the service management system **200**. These content names may then be mapped to multiple content providers if desired. For example, sports data can come from multiple commercial sources. The content server **537, 547** may the return a list of structures, with a separate structure for each service provider supplying data. Individual structures may contain a mix of data and pointers to data; e.g., content text, content filename, content URL, content audio filename, and a list of name/value pairs containing domain-specific field values. For example, stock quotes provider **537** may include the following defined fields: opening price, high, low, closing price, volume, 52-week high, and so forth. Filenames and URLs may be fully qualified. Although a common structure may be used, the fields that are actually returned depend on the content servers and the data required to manifest the product designed. Content may also be delivered from the Internet **530**, satellites **534, 536**, a hybrid of wireless and wireline network topologies, or one or more databases **557**. Content may be provided by any suitable content provider as is known in the art.

In one embodiment of the invention, delivery façade **501** delivers actual content to subscribers **210**. Delivery façade **501** may mask the details from their callers and provide a uniform interface to the rest of the system. Delivery façade

5   **501** allows service providers to be changed and added, and individual services to be extended and modified, with minimal changes to the rest of the system. In one embodiment of the invention, delivery façade **501** is a service management façade as described above. Alternatively, delivery façade **501** may be implemented via CORBA. Alternatively, delivery façade may be implemented via

10 a suitable remote messaging protocol. The internal interfaces between the content servers and their corresponding receptors/providers are as needed, and are transparent to non-subsystem components.

FIG. 6 shows a method for providing services to a vehicle in accordance with the present invention at **600**.

15 At **610**, a vehicle client sends a request for a service. Vehicle client may be, for example, a vehicle as described above or an occupant of the vehicle. For example, the request may be a request to subscribe the vehicle.

At **620**, the request is forwarded to a service management application. The request may be forwarded, for example, via one or more of the interfaces

20 described above, such as a communication network or PSTN or carrier network.

At **630**, a response is returned to the vehicle client. The response may be a request for additional information ("Please identify yourself") or ("How may I help you?") Alternatively, the response may be an informative message. For example, the response may be a subscriber agreement describing terms and

25 conditions to be complied with in order to become a subscriber to service management application and/or systems related to or in communication with service management application **240**.

At block **640**, service management application may determine information about the vehicle client. In one embodiment of the invention, this information is relevant to the current session between the vehicle client and the service

5   management application. For example, service management application may determine a geographic location of the vehicle or a destination of the vehicle. This information may be used to provide services that are particularly relevant to the vehicle's current location or current situation. For example, service management application may also determine if the vehicle is in need of

10   assistance by doing a diagnostic determination.

In one embodiment of the invention, the information determined at **640** may be sent to the vehicle client (as shown at block **650**). This may be done, for example, for purposes of confirmation.

In one embodiment of the invention, the vehicle client may provide

15   additional information to the service management application (as shown at block **660**). For example, the vehicle client may add to or change the initial request. The vehicle client may also edit information determined by the service management application. Alternatively, the vehicle client may provide additional data such as a user name or subscriber identification.

20   In one embodiment of the invention, the service management application may respond to the information from vehicle client provided at block **660**. For example, the application may send revised coordinates or updated information. Alternatively, the application may confirm a user name, subscriber information or destination.

25   In one embodiment of the invention, as seen at block **680**, the application may reconfigure the vehicle or components of the vehicle in communication with system **200** if necessary.

In one embodiment of the invention, as seen at block **690**, information gathered during the session may be processed by the service management application. For example, once a session is complete, data gathered during the

5 session may be stored by the application. Alternatively, data gathered during the session may be used to update the vehicle client profile. Alternatively, the data may be used for evaluation purposes.

FIG. 7 shows one embodiment of a method for registering enterprise java beans (EJBs) in accordance with the present invention at **700**. Data to be made

10 available to vehicle client **210** may be associated and stored with an appropriate EJB. At step **701**, a suitable Web application server may pass the name of a JAR file containing an EJB to a suitable EJB deployer. At step **702**, the EJB deployer may instantiate a home interface of the EJB. At step **703**, a JNDI service may bind a name and handle for the home interface. At step **704**, the

15 JNDI service may then instantiate and run the startup class. At **705**, the startup class may look up the home interface of the EJB. At **706**, the startup class may return a remote reference for the EJB. This remote reference may be used by the startup class to connect as a service to the service management façade **454** (as seen at step **707**). At step **708**, a reference to the connected service

20 management façade **454** may be stored. At step **709**, the name and home interface reference may be passed to the service management façade **454**. At step **710**, the name and object reference may be bound from the facade **454** to a naming service **765** and/or other middleware components.

FIG. 8 shows one embodiment of a method for finding services managed

25 by service management façade **454** in accordance with the present invention at **800**. In one embodiment of the invention, these services may be obtained from JSP/JavaBean/EJP sequences in the form of a reference to a startup class (as seen at step **801**). At step **802**, a reference to a connected facade **454** may be requested. At step **803**, the name of an EJB to lookup may be passed from the

30 JSP sequence to an application server startup class. At step **804**, façade **454**

may lookup a home handle associated with naming service **765**. At step **805**, naming service **765** or other middleware components may return the home handle to façade **454**. At step **806**, façade **454** may obtain information from the

5 home handle provided at step **805**. This information may take the form of, for example, an "EJBhome" object. At step **807**, an object reference may be returned by façade **454**. At step **808**, the object reference determined at step **807** may be narrowed to a home interface. At step **809**, JSP/JavaBean may find or create the needed EJB for the EJB home interface and an associated service.

10 At step **810**, the EJB home interface may then return the remote reference to be associated with the JSP/JavaBean sequence.

FIG. 9 shows one embodiment of a method for logging on to a service management system in accordance with the present invention at **900**. For example, the routine of FIG. 9 may be used to logon to system **200** described

15 above. At step **901**, a web application server, such as channel **260**, described above, may be used to bind a websession manager EJB to a naming service **765** or other middleware components. At step **902**, a server **975** (connected to or in communication with service management system **200**) may bind an authentication EJB to a naming service **765** or other middleware components. At

20 step **903**, server **975** may bind a case manager EJB. At step **904**, a request may be made by subscriber **210** to login. This request may take the form of a login JSP. At step **905**, a login page HTML may also be sent to subscriber **210**. At step **906**, subscriber **210** may send identification information, such as account and personal identification information to server **260**. At step **907**, server **260**

25 may look up the authentication EJB from step **902**. At step **908**, a reference may be returned from middleware components **765** to server **260**. At step **909**, the information received from subscriber **210** at step **906** may be forwarded to an authentication EJB. At step **910**, a case manager EJB may validate the information. At step **911**, the service management system **200** may return a

30 result. This result may take the form of a result code, such as a code indicating

a successful or failed authentication attempt. The result may also include a subscriber ID. At step **912**, the information of step **911** may also be returned to server **260**. At step **913**, server **260** may store the information of step **911** or

5   part of the information. For example, server **260** may store subscriber identification. At step **914**, server **260** may lookup a case manager EJB. At step **915**, middleware components **765** may return a reference to EJB to server **260**. At step **916**, server **260** may send an account number to casemanager EJB. At step **917**, case managerEJB may open a case. At step **918**, the service

10   management system **200** may return a case ID. At step **919**, the case ID of step **918** may be forwarded to server **260**. At step **920**, server **260** may lookup websession manager EJB. At step **921**, middleware components **765** may return a reference to EJB. At step **922**, a session ID may be looked up for the session. At step **923**, a websession passing subscribed ID and session ID may be created

15   by application server **260**. At step **924**, a success/fail communication, such as an HTML page, may be returned to subscriber **210**. Alternatively, the subscriber may be told in a voice message whether the login attempt was successful.

FIG. 10 shows one embodiment of a method for retrieving subscriber information in accordance with the present invention at **1000**. At step **1001**,

20   servers **975**, connected to or in communication with service management system **200**, may bind an account EJB to middleware components **765**. At step **1002**, subscriber **210** may request to access his subscriber information, for example in the form of a subscriber profile. This request may take the form of a subscriber JSP. At step **1003**, server **260** may look up an account EJB for this request. At

25   step **1004**, middleware components **765** may return a proxy to EJB. At step **1005**, server **975** may lookup a subscriber ID in session. At step **1006**, server **260** may send the subscriber ID of step **1005** to an account EJB. At step **1007**, account EJB may lookup subscriber information. At step **1008**, the subscriber information may be returned to the account EJB. At step **1009**, the subscriber

30   information may be forwarded to server **260**. This information may be forwarded

in the form of a subscriber object. At step **1010**, the subscriber information may be sent to subscriber **210**. For example, the subscriber information may be sent in the form of a subscriber information page or voiced to the subscriber.

5   **FIG. 11** shows one embodiment of a method for updating subscriber information in accordance with the present invention at **1100**. At step **1101**, a server **975**, connected to or in communication with service management system **200** may bind an account EJB to middleware components **765**. At step **1102**, subscriber **210** may request to update subscriber information. This request may

10   take the form of a subscriber_add JSP. At step **1103**, server **260** may look up an account EJB associated with the subscriber account. At step **1104**, middleware components **765** may return a proxy to EJB. At step **1105**, server **260** may look up subscriber information, such as a subscriber ID, in session. At step **1106**, server **260** may send subscriber information, such as an ID to an account EJB.

15   At step **1107**, subscriber information may be looked up from service management system **200**. At step **1108**, subscriber information may be returned to account EJB. At step **1109**, subscriber information may be forwarded to server **260**. For example, this information may take the form of a subscriber object. At step **1110**, subscriber information may be returned to subscriber **210**.

20   This may take the form of a subscriber edit page or a voice prompt. At step **1111**, subscriber **210** may return updated information, for example, by editing the subscriber edit page sent at step **1110** or by speaking edits via a voice-recognition system. At step **1112**, server **260** may lookup account EJB to middleware components **765**. At step **1113**, middleware components **765** may

25   return proxy to EJB. At step **1114**, subscriber identification may be looked up for the session. At step **1115**, server **260** may send updated subscriber information to service management system **200**. This updated information may take the form of a subscriber object. At step **1116**, account EJB may update the subscriber's profile with the updated information. At step **1117**, a result code

30   may be returned. This result code may take the form of a failed update or a successful update. At step **1118**, the result code may be returned to server **260**.

At step **1119**, the result information may be returned to subscriber **210**. For example, the result may be returned in the form of a success/fail HTML page or the result may be voiced to the subscriber.

5   **FIG. 12** shows one embodiment of a method for retrieving a news profile in accordance with the present invention at **1200**. At step **1201**, server **260** may bind a newsprofilehome EJB. At step **1202**, subscriber **210** may send a request for news or information. This request may take the form of a news_profile.jsp. At step **1203**, server **260** may lookup newsprofilehome EJB. At step **1204**,

10   middleware components **765** may return a proxy to EJB. At step **1205**, subscriber information, such as a subscriber ID, may be looked up for the session. At step **1206**, server **260** may send the subscriber ID of step **1205** to a newsprofilehome EJB. At step **1207**, news profile information may be located. This information may take the form of a newsprofile bean. At step **1208**, the

15   service providing the news profile, such as service **236**, **246** described above may be queried for the subscriber. In one embodiment of the invention, the news profile of the subscriber may be stored in a news profile database **1285**. This database **1285** may also be queried for the subscriber. At step **1209**, service **236**, **246** or news profile database **1285** may return news profile data. At

20   step **1210**, news profile data obtained at step **1209** may be returned to newsprofilehome EJBhome. At step **1211**, the news profile data obtained may be returned to server **260**. This data may take the form of a newsprofile object. At step **1212**, the news profile data obtained may be returned to subscriber **210**. For example, the data may be returned as a news profile HTML page or as a

25   voiced output.

FIG. 13 shows one embodiment of a method for adding to a news profile in accordance with the present invention at **1300**. At step **1301**, server **260** may bind a news profile home EJB. At step **1302**, a VUI channel server **1395** may

5   bind a profile server adapter **1397**. At step **1303**, subscriber **210** may make a request to add to his news profile. This request may take the form of a news_add.jsp. At step **1304**, server **260** may lookup a newsprofilehome EJB. At step **1305**, middleware components **765** may return a proxy to EJB. At step **1306**, server **260** may lookup a subscriber ID for the session. At step **1307**,

10   server **260** may send the subscriber ID to newprofilehome EJBHome. At step **1308**, newsprofile home EJBHome may query a service profile database **1285**, such as described above. This query may comprise a subscriber profile query. At step **1310**, the database **1285** or an application associated with the database, such as news services **236, 256**, may return news profile data. At step **1311**, the

15   news profile data may be returned to newsprofilehome EJBhome. The data may be returned, for example, in the form of a profile bean. At step **1312**, the news profile data may be sent to server **260**. The data may be sent, for example, in the form of a newsprofile object. At step **1313**, server **260** may indicate a specified category to be added to the news profile object. At step **1314**, a news

20   profile entity bean may lookup a profile server adapter. At step **1315**, middleware components **765** may return a proxy to the adapter looked up at step **1314**. At step **1316**, a newsprofile entity bean may add a new profile entry to the profile of the subscriber. This profile may be stored, for example in VUI channel host profile adapter. At step **1317**, VUI channel host profile adapter **1397** may

25   return a code indicating the status of the subscriber's profile. For example, the code may indicate if the news profile has been adapted successfully or has failed to be adapted. At step **1318**, news profile entity bean may also insert new profile data in addition to the new profile entry of step **1316**. At step **1319**, the profile database **1385** or services **236, 246** may also return a code indicating the status

30   of the subscriber's profile. For example, the code may indicate that the new

profile data has been successfully added or has failed to be added. At step **1320**, this code may be forwarded to server **260**. At step **1321**, the information from the code may be returned to subscriber **210**. This may take the form of, for

5   example an HTML page or a voiced confirmation.

FIG. 14 shows one embodiment of a method for providing a communication service in accordance with the present invention at **1400**. In the embodiment of **FIG. 14**, the communication service is an e-mail service. At step **1401**, server **260** may bind a websession manager EJB. At step **1402**, server

10   **260** may also bind a subscriber profile home EJB. At step **1403**, a server **975**, connected to or in communication with service management system **200** may bind a subscriber management adapter **1475**. At step **1404**, subscriber **210** may send a request to server **260**. The request may be, for example, a request to access a message center. At step **1405**, server **260** may send a response to

15   subscriber **210**. For example, server **260** may send a response in the form of a Message Center Home page rendered via HTML. At step **1406**, the subscriber may then send another request to server **260**. This request may take the form of, for example, a view_email.jsp. At step **1407**, server **260** may lookup a subscriber profile home EJB. At step **1408**, middleware components **765** may

20   return a reference to EJB. At step **1409**, server **260** may look up subscriber information, such as a subscriber ID, during the session. At step **1410**, server **260** may also lookup a profile for the subscriber. At step **1411**, server **260** may check if an electronic mail account has been created for the subscriber. At step **1412**, server **260** may return a response to subscriber **210**. This response may

25   take the form of, for example, a return email setup HTML. At step **1413**, subscriber **210** may send another post to server **260**. This post may take the form of, for example, a requested email address. At step **1414**, server **260** may check if the requested email address is in use. Server **260** may also lookup a profile for the subscriber as seen at step **1415**. At step **1416**, server **260** may set

30   an email address on the subscriber profile. At step **1417**, middleware

components **765** may lookup a subscriber management adapter **1475**. At step **1418**, middleware components **765** may return a reference to the adapter **1475**. At step **1419**, subscribe profile may create an account with new email. At step

5   **1420**, the subscriber management adapter **1475** may return a result code. The result code may take the form of, for example, a code indicating success or failure in creating the new email account. At step **1421**, server **260** may lookup a subscriber ID in session. At step **1422**, subscribe profile EJB may return a result code. The result code may take the form of a success or fail code. At step

10   **1423**, a redirect command may be returned to subscriber **210**. At step **1424**, subscriber **210** may request email service. This request may take the form of an email servlet. In one embodiment of the invention, this request passes the session ID. At step **1425**, a VUI channel host bridge server **1495** may lookup a websession manager EJB. At step **1426**, middleware components may return a

15   reference to EJB. At step **1427**, VUI channel host bridge server **1495** may find a websession. In one embodiment of the invention, the websession passes the session ID. At step **1428**, websession manager may return a websession. In one embodiment of the invention, the websession contains a subscriber ID. At step **1429**, VUI channel host bridge server **1495** may return an email response to

20   the subscriber. In one embodiment, of the invention the response takes the form of an email session HTML based on template files and the subscriber ID found at step **1428**.

While the embodiments of the present invention disclosed herein are presently considered to be preferred, various changes and modifications can be

25   made without departing from the spirit and scope of the invention. The scope of the invention is indicated in the appended claims, and all changes that come within the meaning and range of equivalents are intended to be embraced therein.